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Increasing The Adherence to Updated Clinical Practice Guidelines for TB Screening Among HIV Patients Entering a Congregate Setting Utilizing a Clinical Reminder

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INCREASING THE ADHERENCE TO UPDATED CLINICAL PRACTICE GUIDELINES FOR TB SCREENING AMONG HIV PATIENTS ENTERING A CONGREGATE SETTING UTILIZING A CLINICAL REMINDER

by

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Abstract

Purpose: The purpose of this Doctor of Nursing Practice project was to update an existing tuberculosis policy for screening HIV-positive individuals entering a south Texas jail to meet current evidence-based guidelines and increase the adherence of jail staff to the updated screening process.

Background and Significance: In 2015, over 700,000 people were jailed in the United States with over 20,000 being HIV-positive. Tuberculosis is highly contagious and spreads through the air. HIV is a virus that targets the immune system. HIV-positive people are 17-22 times more likely to contract tuberculosis. The current screening process at the jail showed a low adherence among staff for placing a purified protein derivative and performing a chest x-ray in the HIV population.

Method: A retrospective chart review of pre-intervention and post-intervention HIV-positive inmate charts was conducted. The implementation of an updated tuberculosis policy and staff education provided a new TB screening process. The addition of a clinical reminder sticker affixed to the computer monitors in the screening area was a component of the intervention.

Results: Results showed an increase in purified protein placement, chest x-rays and documentation post intervention with a significant correlation.

Conclusion: Policy revision and the use of a clinical reminder sticker can increase staff adherence to process change. Evidence supports that chest x-ray is a valuable adjunct when used with purified protein derivative to screen HIV-positive inmates for tuberculosis in a correctional facility. Strengthening the tuberculosis screening process to include both purified protein derivative and chest x-ray protects other inmates and the community. Jails are expected to provide care consistent with community standards and evidence-based practice.

Keywords: Jail, TB, HIV, Screening

The U.S. correctional system houses over 2 million inmates daily, and no one facility is alike. This system is made up of jails, prisons, and other holding facilities for people who commit crimes (Centers for Disease Control [CDC], 2015). A jail is a local facility operated by a police department that can house inmates for less than a day or up to two years before they are released or sent to a long-term facility such as a prison (CDC, 2015). Health prevention and protection is a major concern in this type of population, and health screening upon entry into the facility is the first step to correctional health. HIV-positive people are a sub-population in the jail. Due to immunosuppression, individuals with HIV are at risk for diseases such as tuberculosis (TB). There were over 9 million people diagnosed with TB worldwide in 2014 and of those over 1 million were HIV-positive (World Health Organization [WHO], 2017).

Statement of the Problem

Disease knows no boundaries, and in congregate settings such as jails the number of people with illnesses reflects those found in the surrounding community. The jail system is deeply embedded in the community and serves to house individuals who commit criminal offenses (CDC, 2001). Prevention is important to protect those who reside and work in a jail and the community to which the incarcerated are released. According to the CDC, in 2010 there were over 20,000 people incarcerated across the United States with HIV/AIDS, with the majority acquiring the virus before entering a correctional facility (CDC, 2015).

HIV is a virus that targets the body's immune system and its ability to fight infection. The cells that normally respond are destroyed by the virus (CDC, 2017). Therefore, HIV-positive people are considered immunocompromised and more susceptible to other infections such as TB creating co-infections (U.S. Department of Health and Human Services, 2017).

TB is a highly contagious bacterium that is spread through the air and requires specialized treatment to prevent death (CDC, 2013). Screening HIV-positive inmates for TB can be a daunting task given the complexity of medical care in the congregate setting. The tools used to screen for TB have not changed over the years. The process of how a jail screens and determines high-risk patients is critical in evaluating a person's TB risk. The method used in the jail chosen for this project is by placing a Mantoux tuberculin skin test. This method requires an injection of tuberculin purified protein derivative (PPD) under the skin and waiting between 48-72 hours before being read by a health professional (CDC, 2016). In HIV-positive individuals, PPDs are necessary even if the possibility of a false negative is present given that an HIV-positive person who reacts to a PPD without clinical symptoms could have active TB disease (U.S. Department of Health and Human Services, 2017). Additionally, inmates on anti-retroviral therapy can react to a PPD placement due to viral suppression by these drugs (U.S. Department of Health and Human Services, 2017). Unfortunately, the time-frame from placement to the reading of the test is lengthy and places other inmates at risk if asymptomatic HIV-positive inmates are positive for TB disease during the waiting period and housed with the general population (CDC, 2016; Degner, Joshua, Padilla, Vo, & Vilke, 2016). In HIV-positive inmates, a chest x-ray can significantly reduce the time-frame in identifying TB disease if the process is consistent and efficient. Screening HIV-positive individuals with a chest x-ray before they are housed or released protects others in the jail and community (Banu et al., 2015, p. 2). The policy for the facility chosen for this project did not reflect this practice.

Assessment

Correctional health is an important component of community health and protecting the population from TB can be a monumental task. The jail selected for this quality improvement

project is located in south Texas and can hold over 4,500 inmates with a daily average of about 3,500 inmates and as of July 2017 was near its capacity (Bexar County Sherriff's Office, n.d.).

Detention Health Care Services (DHCS) for the jail is an extension of a larger healthcare system that is recognized for its achievements and advancements in technologies and patient care delivery, with magnet status and a continuous effort for excellence (University Healthcare System, 2017). DHCS has a senior director and a medical director. The senior director is the leader of the business and healthcare operations of DHCS and ensures equilibrium and communication with the larger healthcare system. The medical director oversees the providers, other healthcare professionals, and care delivery.

Every HIV-positive person entering the jail setting is scheduled for a visit with the HIV-clinic within the larger healthcare system. This clinic is known for its comprehensive services in HIV care. These inmates receive laboratory and treatment services that extend beyond incarceration into the community to ensure a seamless transition into what is known as the "free world" – a term used by inmates when speaking about outside the jail walls.

TB screening documentation of new inmates is electronic and partially on paper creating an overwhelming task for recording, tracking, and following up on inmates. The amount of data created as inmates arrive around the clock at the jail leaves little time to align and improve the process. A needs assessment that identified gaps through analyzing all elements of the TB screening process (Dickerson, 2014) was conducted helped guide the development of an intervention to improve the existing TB screening policy and process.

During an inmate's health history intake, the nurse will complete the electronic TB note while simultaneously asking the inmate questions and inputting their responses. A current diagnosis list populates in a section of the note near the TB screening area allowing the nurse to

review for a diagnosis of HIV and make the decision for PPD placement and ordering of a chest x-ray. Additionally, if a patient informs the nurse they are HIV-positive the nurse will input that information in the history and offer a PPD and chest x-ray.

When a PPD is indicated it is placed by a nurse or medical assistant in the non-dominant volar surface of the inmate's forearm. After placement, a TB form is completed and placed in an inbox in the screening area for pick-up by the medical assistance assigned to read PPD placements in 48-72 hours. An Excel® spreadsheet is updated by the medical assistant based on the paper forms completed during the intake process documenting the placement of the PPD and information on if a chest x-ray was ordered. The information recorded by the medical assistant is forwarded to the infectious control nurse for the facility after the PPD reading is completed.

The infection control nurse spends about 4-6 hours reviewing reports generated by the medical assistant to include the last PPD reading and chest x-ray for those who are considered PPD positive (an induration ≥10 mm in diameter) including HIV-positive inmates. There is only one medical assistant who does PPD readings between two locations (main jail and annex), and the main jail has seven floors, each housing hundreds of inmates. Each reading lasted about 5 minutes. The list of inmates due for a PPD reading can have anywhere from 50-100 inmates for the main jail and another 10-30 at the annex.

Results for a PPD are measured in millimeters, the standard unit of measurement for this type of test. The current practice guidelines recommend a positive PPD result for HIV-positive patients is ≥ 5 mm (Lewinsohn et al., 2017). This measurement is recorded as a numerical value followed by millimeters (e.g., 0 mm, 5 mm, and 10 mm) in the electronic health record. The result is used for confirmation of a prior positive (documented PPD ≥ 5 mm when previously tested) or positive converter (a documented 0 mm in a previous record and now presents with ≥ 5

mm) and are necessary for reporting and tracking purposes. A chest x-ray is an additional diagnostic approach, offered to all patients who are symptomatic for TB or have HIV disease, to examine for active TB within the imaging (Lewinsohn et al., 2017). All chest x-rays are sent electronically for interpretation by a radiologist. The chest x-ray is only offered when clinically indicated based on a positive TB screening questionnaire, a positive PPD ≥10 mm in people without HIV disease, and all patients who are HIV-positive. Although a chest x-ray is offered, a patient has the right to refuse this testing. The PPD is available to all patients entering the jail setting.

In 2016, the main jail and annex placed 26,280 PPDs and read 22,009 PPDs at a cost of $0.01 per unit dose. The difference in placements versus readings is due to the small number of inmates who do not stay long enough to have the PPD read, despite the average length of stay being about 34 days. Inmates who received a chest x-ray totaled 1,551 at a rate of $80 per x-ray which equated to $124,080 for 2016. In regards to HIV-positive inmates, there were over 300 incarcerated from January 1, 2016 through December 31, 2016. Not all of these inmates received a chest x-ray.

The process for TB screening and monitoring has not been revised or reviewed since 2014 according to the policy date. The current practice in the jail is to place a PPD and order a chest x-ray on all HIV-positive inmates entering the jail regardless of previous results due to the increased risk for these immunocompromised patients to contract and spread TB. A review of the policy did not reflect this practice. The minimum standard stated in the policy was to place a PPD. However, the jail attempts to exceed this standard by ordering a chest x-ray for all HIV-positive inmates.

When speaking to the staff about the TB screening process, many inconsistencies were identified regarding the placement of PPDs, ordering of chest x-rays, what course of action to take in light of previous results, and documentation in inmates' medical records. Jail staff gave varying responses on how to handle TB screening in HIV-positive inmates when queried. The recommendation for a PPD is low in HIV-positive inmates due to the lack of knowledge on the need for PPDs to be placed in this population leaving many inmates not properly screened. Furthermore, staff assumed the process for the HIV-positive population was the same as for non-HIV inmates. Many believed that a negative chest x-ray from a previous admission is good for up to a year. This assumption is false because HIV-positive individuals are more susceptible to TB and could place other inmates at risk of being exposed to TB if an HIV-positive inmate enters the jail setting without being offered a chest x-ray regardless of previous chest x-ray results.

Readiness for Change

The staff was given a tool to assess their readiness for change (Nelson, Bataldan, Godfrey, & Lazar, 2011). Six forms were returned. The low return was attributed to the additional burden that completing the form placed on the busy screening staff. The areas assessed focused on leadership, staff, patients, performance, and information technology. Based on the tool, the staff found it difficult to understand the healthcare team's performance goals and its fit into the larger healthcare organization.

The administration and leadership of DHCS provided a letter of support to review existing processes and make recommendations for change to improve TB screening in HIV-positive inmates (see Appendix C).

Recommendations and Guidelines

The current recommendations by the accrediting agency is to have an established tuberculosis program in place to effectively screen, monitor, and treat patients with tuberculosis (National Commission on Correctional Healthcare [NCCHC], 2014). Every jail is unique in its inmate capacity, healthcare staff, and resources to operate a tuberculosis program. It is important for facilities to examine their status and adapt to the needs of the patient population through quality improvement. There are no recommendations to save time or money. However, efficiency is important in any program to ensure that consistency and reliability are maintained in program execution.

The 2017 clinical practice guidelines from the Official American Thoracic Society/Infectious Diseases Society of America/Centers for Disease Control were published in January and provided guidance in identifying areas of improvement in the jail's current program (Lewinsohn et al., 2017). The use of PPD, chest x-ray, and other laboratory testing are recommended in the guidelines along with the level of evidence for each recommendation. These recommendations explicitly state they are not to be used to provide definitive care (Lewinsohn et al., 2017).

Project Identification

Purpose

The purpose of this DNP project was to update an existing TB policy for screening HIV positive individuals entering a south Texas jail to meet current evidence-based guidelines and increase the adherence of jail staff to the updated screening process outlined in the policy.

Objectives

The objectives of this project are derived from an assessment of the process for screening HIV-positive inmates for TB. The pre-intervention data revealed a need to update the TB screening policy and increase the adherence of staff to the screening process. The intervention is aimed at improving the outcomes of the overall health of HIV-positive inmates, and the protection of others within the jail and the community.

The first objective of this project is to increase the placement of PPDs in HIV-positive inmates from 87% to 90%. The rational for the recommendation for a PPD is low in HIV-positive inmates due to the lack of knowledge on the need for PPDs to be placed in this population leaving many patients not properly screened.

The second object is to increase the ordering of chest x-rays in HIV-positive inmates on admission from 38% to 80%.The rationale for increasing chest x-rays is the staff assumed the process for the HIV-positive population was the same as for non-HIV inmates in that a negative chest x-ray from a previous admission is good for up to a year placing other inmates at risk of being exposed to TB.

The third objective is to increase the completion of the TB note from 78% to 90% which includes the documentation of PPD placement, PPD reading, ordering of a chest x-ray, and chest x-ray interpretation. The rationale is the jail TB note lacked the appropriate documentation for review causing difficulty in determine PPD placement, PPD reading, chest x-ray ordering, and chest x-ray interpretation.

Summary and Strength of the Evidence

Current research exists for TB screening to effectively prevent and control this disease. However, there are differences in the processes each jail implements based on their resources,

prevalence, and ability to manage their inmate population (Degner et al., 2016). A collaborative effort is imperative for medical and nursing staff to work with detention officers of the jail to implement processes and protocols for TB screening. TB research is abundant and incorporates a variety of evidence to support interventions based on the current prevalence in correctional facilities and the public.

Banu et al. (2015) conducted a Level III case-controlled study in a jail to analyze TB screening through active case finding. This level of research provides data that has an effect or direct cause of health outcomes (Kim & Mallory, 2014). This study lasted from October 2005 to February 2010 with an average annual influx of 100 to 150 inmates daily. An unknown tool not listed in the article was used to screen patients, and those suspected of active TB were isolated until they can be transported to a local hospital for sputum collection. Three hundred fifty-seven (357) inmates had positive sputum specimens supporting an effective screening process. The limitation identified in the screening process was the lack of chest x-rays which prevented the detection of pulmonary TB among those with negative sputum smears. It can take up to two months to have a confirmatory negative from a sputum culture (Pfyffer & Wittwer, 2012). All the inmates sent to the hospital were kept for sputum collection and returned to incarceration after they received negative specimen results. The time for returning was not provided. This creates an enormous cost not mentioned in this study. The use of a chest x-ray would provide cost avoidance and a savings for the correctional facility and local hospital.

Social and cultural barriers exist in TB screening according to De Frana Alves et al. (2016) who conducted a Level VI descriptive study. Interviews were conducted by health professional to understand patients' perceptions to a number of social and cultural barriers. This level of evidence provides a descriptive approach to identifying problems in healthcare (Kim &

Mallory, 2014). Patients demand a level of trust and expectations form health professionals to understand their disease or symptoms and seek care before the progression of an illness. The authors attributed a late TB diagnosis to a breakdown in a system's process, lack of training among professionals, and poor patient education regarding the disease. Financial support of TB education and training is important to provide the necessary resources for a patient to participate and adhere to testing, treatment, and health wellness.

The use of a PPD and chest x-ray in inmates entering a jail setting by Degnar et al., (2016) provides a cost-effective way of detecting TB in high risk groups. This study took placed at a correctional facility in a major metropolitan city within the United States. The authors identified barriers in correctional health which include limited budgets and the use of short-term holding facilities. The correctional facility was composed of seven detention facilities compared to the two facilities being evaluated in this quality improvement project. The study was two-fold. First, the screening process for active TB using a PPD from 2002 through 2007 was reviewed and then compared to the time period of 2008 through 2014 when the use of digital chest x-ray was implemented. In the 2002 through 2007 portion of the study, a TB questionnaire was used and the reading of the PPD along with a physical assessment determined if the inmate needed a chest x-ray. This method of screening did not differentiate between active TB and latent TB. In 2008, the jail moved to using only a chest x-ray for screening all inmates due to the increased risk of TB exposure (Degner et al., 2016).

The study concluded that it was more effective to conduct a chest x-ray due to the decreased risk of exposure for the general population. Additionally, the chest x-ray alone method (2008 through 2014) was found to be more cost effected with a cost of $399.11 per case ($n$ = 37) compared to $731.35 per active TB case during the PPD time period (2002 through 2007). There

were eight active TB cases during the PPD time period at a total cost of $5,850.78. This cost included PPD testing, chest x-rays, treatment for latent TB, and the cost for rescreening thousands of people due to exposure to the eight active cases (Degner et al., 2016). This study strongly correlates with this quality improvement project, but it does not reflect specifically the HIV-positive population in the jail.

The use of a reminder sticker has been employed to help reinforce practice change in clinical areas to improve adherence. Bruminhent, Keegan, Lakhani, Roberts, and Passalacqua, (2010) used this simple intervention to reduce catheter associated urinary tract infection rates in patients with indwelling catheters ($N = 400$). The study was a Level III quasi-experimental prospective pre- and post-intervention design. The target health professionals in this study were physicians. The sticker served as a reminder to assess a patient's continued need for catheterization and prompted to remove the device if it was no longer necessary. The practice guidelines were updated in the facility where the study was being conducted. The study showed a long term sustainable intervention that supported the appropriate use of indwelling catheters in patients and a decrease in catheter associated urinary tract infections (Bruminhent et al., 2010). Although this facility used an electronic healthcare record, a computer generated alert was unavailable so a sticker was placed on the patients' medical binders. It was unclear if the facility was in a transitional phase with electronic order entry or documentation. It did state that the majority of physicians did not use electronic order enter. This article is relevant to this project because a practice guideline will also be updated. An additional similarity is the jail has an electronic healthcare record for their population but a computer generated reminder is not available in the system.

The majority of articles reviewed for this quality improvement project supported the use of a chest x-ray for screening for active TB (Banu et al., 2015; Degner et al., 2016; Sanchez et al., 2013; Valencia et al., 2015). Current guidelines support the use of PPD and chest x-rays in the HIV-positive population (Lewinsohn et al., 2017). Although there is controversy in the use of PPD in HIV-positive inmates due to the possibility of false negatives it remains a mainstay in TB screening in the HIV-positive population who are adherent to their antiretroviral therapy (U.S. Department of Health and Human Services, 2017). Patients on antiretroviral therapy can react to a PPD placed and would require immediate assessment for active tuberculosis even if asymptomatic (U.S. Department of Health and Human Services, 2017). It is important to utilize all tools in a cost effective way to improve TB screening in not only HIV-positive inmates but all inmates moving through the jail system.

Methods

Project Intervention

Prior to project implementation, pre-intervention data was collected by reviewing charts (n = 51) associated with screening HIV-positive inmates from June 17, 2016 to August 15, 2016. The data was doubled check to ensure accuracy in capturing the preliminary information related to the study variables. The updated policy was reviewed by the infection control nurse and submitted to the medical director and the senior director for approval. One-on-one educational sessions with the staff were then conducted to ensure that everyone who conducts inpatient screening was well informed of the updated policy. A roster was used to make sure all screening staff received policy education.

The reminder sticker (see Appendix A) was afixed with Velcro® to each monitor in the screening area. Additional reminder stickers were kept in the nursing supervisor's officer for

replacement if one went missing. A process checklist forms (see Appendix B) was developed and stacks were placed at each computer. The form was to be stapled to the TB form by staff when screening HIV-positive inmates. Each individual (i.e., medial assistant, radiology technician) in the process was instructed to check the appropriate box on the form once their task was completed. Chest x-rays are usually completed within 24 hours of initial screening so the TB nurse normally knows the results by the next day. A chest x-ray report is printed and placed on her desk every morning. Four days were allowed for all screening elements to be documented in each patient chart. At the end of the month all the forms were given to the TB nurse who separated the HIV-positive inmate forms from the others and ensured documentation was present on these patients.

Ethical Considerations

Ethical considerations are an important element in any quality improvement project but especially important when dealing with individuals that can be easily exploited. Because of this, jail inmates are considered a vulnerable population; who must be protected. During this project there were no direct patient interactions when performing the retrospective chart reviews pre- and post-intervention that would have put the inmates at risk. Additionally, the intervention was aimed at improving the health and wellbeing of HIV-positive inmates and those who come in contact with them. Actually, the policy that was in place for TB screening among inmates did not reflect the higher standard of practice the facility wanted to maintain. So, adherence to the updated policy that reflects the higher standard of ordering chest x-rays on all HIV-positive inmates is an improvement in care with no possibility of adverse effects.

According to Cislo and Trestmen (2013), the structure of the correctional environment is different than a community of people given the levels of restraint and additional barriers a

researcher would encounter in this system. Therefore, they recommended seeking Institutional Review Board (IRB) approval and leadership support in the correctional system to place project emphasis on the mission and goals of the system in order to have a successful project (Cislo & Trestman, 2013). This allows the research to have a meaningful impact on the patient population being studied. IRB approval for this quality improvement project was obtained from the educational institution of the project coordinator (See Appendix D), the entity responsible for approving projects for the larger healthcare system responsible for care at the jail (See Appendix E), and the facility where the project took place (See Appendix F).

Data Collection

The project began on June 15, 2017 and ended on August 15, 2017. For this quality improvement project 55 electronic records were reviewed before and 71 records were reviewed after the intervention to determine if a clinical reminder sticker intervention was effective in improving the TB screening process for HIV-positive inmates in the jail setting. Data collected pre- and post-intervention included similar demographics (See Table 1) that were derived from the electronic medical record note and what the facility collected on each individual entering the jail setting.

The various process elements were selected based on the required information to be inputted during the screening process to make the electronic TB note complete. The data for this quality improvement project was analyzed using IBM Statistical Package for Social Sciences Version 24© (SPSSv24).

The statistical test selected was the chi-square test. The PPD Complete variable required that the PPD be placed and read (See Table 3). The CXR Complete variable required that the CXR be ordered and interpreted (See Table 4). The PPD/CXR/Documentation variable consisted of the completion of the afore mentioned variables and proper documentation in the patients'

electronic medical record. If each variable was not correctly completed based on the above set of rules, it was considered incomplete.

Table 1

Project Variables

Demographics

- Age
- Gender
- Ethnicity

Process Elements

- PPD Placement
- PPD Refusal
- CXR Ordering
- CXR Complete/Incomplete
- PPD Reading
- PPD Complete/Incomplete
- CXR Results
- CXR Cost

Documentation

- PPD Documentation (placed, read, refused)
- CXR Documentation (ordered, results, refused)
- PPD/CXR Documentation Completion
- Staff Education

Results

The first objective of increasing the placement of PPDs in HIV-positive inmates from 87% to 90% was met with 93% of HIV-positive inmates having a PPD placed; only 89% were read. The early release of people prior to the 48-72 hour window most likely contributed those that were not read and documented. The second objective of increasing the ordering of chest x-rays on admission from 38% to 80% was met with 86% of HIV-positive inmates having a chest x-ray ordered. However, only 70% of the chest x-rays ordered were completed and interpreted. This could be attributed to occasional system glitches reported by the radiology technician where chest x-ray interpretations do not upload the electronic health record. The third objective of

increasing the completion of the TB note from 78% to 90% was almost met with 89% of TB notes being complete during the intervention period.

The descriptive statistics for the preliminary data showed 51% Hispanic with 87% being male. Post intervention analysis showed 59.1% Hispanic with 83% being male (see Table 2). Both time periods reveal a large Hispanic population of HIV-positive individuals entering the correctional setting. The U.S. Census Bureau (2010) estimates over 60% of the population of this major metropolitan area to be Hispanic or Latino. The local health district reports those living in the area with HIV, 78.7% male, and of those, 34.4% are Hispanic (Texas Department of State Health Services, 2017). This correlates with the project demographics of over half of the HIV-positive inmate being Hispanics.

Table 2

Ethnicity and Gender Intervention Crosstabulation

			Gender		
Intervention			Female	Male	Total
Pre-Intervention	Ethnicity	White	6	12	18(32.7%)
		Hispanic	1	27	28(51%)
		Black	0	9	9(16.3%)
	Total		7(13%)	48(87%)	55
Intervention	Ethnicity	White	2	16	18(25.4%)
		Hispanic	4	38	42(59.1%)
		Black	6	5	11(15.5%)
	Total		12(17%)	59(83%)	71
Total	Ethnicity	White	8	28	36
		Hispanic	5	65	70
		Black	6	14	20
	Total		19	107	126

The PPD Complete and Incomplete variable required that the PPD be placed and read. Table 3 shows an increase of completed PPDs from 78% pre-intervention to 89% post-

intervention with incomplete PPDs dropping from 22% to 11%. The CXR Complete and Incomplete variable required that the chest x-ray be ordered and interpreted. Table 4 shows that the chest x-ray completion post-intervention increased 39% with incomplete chest x-rays dropping 39% post-intervention. Table 5 shows documentation completion improved from 22% pre-intervention to 35% post-intervention a percent change of 13%. Similarly, the percentage for incomplete documentation was decreased by 13% post-intervention.

Table 3

Purified Protein Derivative Complete and Incomplete

	Complete	Incomplete
Pre-intervention[a]	43 (78%)	12 (32%)
Post-intervention[b]	63 (89%)	8 (11%)

[a]*n* = 55
[b]*n* = 71

Table 4

Chest X-ray Complete and Incomplete

	Complete	Incomplete
Pre-intervention[a]	17 (31%)	38 (69%)
Post-intervention[b]	50 (70%)	21 (30%)

Note.
[a]*n* = 55
[b]*n* = 71

Table 5

Documentation Complete and Incomplete

	Complete	Incomplete
Pre-intervention[a]	12 (22%)	43 (78%)
Post-intervention[b]	25 (35%)	46 (65%)

Note.
[a]*n* = 55
[b]*n* = 71

A chi-square was completed by SPSSv24. The chi-square answers this question – Is there an association between the intervention and completed PPDs, chest x-rays, and documentation? The hypothesis for this test is:

H^o: There is no association between the intervention and completed PPDs, chest x-rays, and documentation.

H^a: There is an association between the intervention and completed PPDs, chest x-rays, and documentation.

The level of significance was set at .05. The results shown in Table 6 reject the null hypothesis. It indicates that there was a significant association between the intervention and complete PPDs, chest x-rays, and documentation, x^2 (1) = 23.03, p = .000.

Table 6

Intervention for PPD Completion, CXR Completion, and Documentation Completion

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-square	23.035[a]	1	.000		
Continuity Correction[b]	21.338	1	.000		
Likelihood Ratio	24.051	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-linear Association	22.853	1			
N of Valid Cases	126				

Note.
[a]0 cells (.0%) have expected count less than 5. The minimum expected count is 25.32.
[b]Computed only for a 2x2 table
p = .000 for significance

Discussion

The project intervention success was due in part to a structured health system within the jail. The health professionals working in the jail belong to a larger organization outside of the jail

healthcare system making a variety of resources available to the inmates and staff members. Screening hundreds of inmates on a daily basis requires an orchestrated process to provide successful intake methods. Observations of the TB screening process with multiple staff provided insight into the unique encounters experienced with all inmates including HIV-positive individuals. Creating a momentum of praise and acknowledgment of staff members' contributions to the TB screening process facilitated a buy-in by the members. It helped aide their understanding and significance of the intervention.

Every project has difficulties during the implementation phase. It takes a large number of staff members to efficiently carry out DHCS tasks. Identifying the staff who participates in the TB screening process was challenging when many members are cross-trained. Also, the influx of HIV-positive inmates was sporadic and some shifts would not get any HIV-positive inmates during screening while others received two or three. Over forty people were educated one-on-one among four different shifts requiring multiple days and times for the education. Group meeting do not take place due to the inconvenience and disruption of intake screening, sick call, treatments, and medication administration. Therefore, the project intervention had to adapt to efficiently fit into the intake process without creating an additional burden.

During the project staff was asked questions about the screening of HIV-positive inmates. This showed an interest in initiating the process correctly. The reminder stickers stayed in place and none had to be replaced showing overall respect for the project. The reminder stickers were on the monitor where they would have to have been deliberately removed in order for them go missing. Additionally, acceptance of the project coordinator was observed in the staff when seeking clarification of the process related to the project. The staff remained interested in the project and continually asked about the status and offered support. Their interest was reinforced

through expressing appreciation for their support and contributions during screening and with encouragement to keep up the great work.

The main strength of the project was derived from existing processes and resources readily available to the screening staff and infectious disease nurse. During intake, inmates are asked about their HIV status and an existing diagnosis of HIV can be seen in the record during completion of the TB questionnaire. This aided in the immediate identification of the project's target population. When an HIV-positive individual was identified, the reminder sticker was visible to prompt the staff to immediately offer a PPD and initiate an order for a chest x-ray. The inmates were provided with a mask until their chest x-ray was cleared, similar to non-HIV inmates who have had a prior positive PPD, or have a positive PPD after placement.

Relation to Evidence

There is a consistent approach to TB screening occurring in many other correctional facilities described in the literature (Banu et al., 2016; Degner et al., 2017; Lewinsohn et al., 2017; Sanchez et al., 2013;Valencia et al., 2015). However, little information is mentioned in the literature about screening HIV-positive inmates for TB entering the correctional setting. The use of a clinical reminder sticker providing a prompt for the policy change and staff education on offering a PPD and chest x-ray to all HIV-positive individuals entering the correctional setting proved successful. This study outlines a simple intervention that is low cost and effective for other correctional institutions to facilitate change. This NCCHC (2014) that accredits this jail provides overall facility expectations to develop, implement, and sustain a TB screening program that encompasses an effective approach. Targeting high risk inmates such as those that are immunosuppressed could limit the risk of exposure to active TB. The addition of chest x-rays can increase the detecting active TB disease in HIV-positive inmates (Degner et al., 2017).

Limitations

Throughout the project there were a number of identified limitations. The screening process is only for existing HIV-positive individuals currently entering the jail setting and does not incorporate those inmates that test positive for HIV once incarcerated. HIV testing is offered to anyone in the jail by submitting a sick call request for a sexually transmitted diseases evaluation. Offering chest x-rays for newly diagnosed HIV-positive inmates already incarcerated remains open for discussion.

The increase in chest x-rays adds additional work load for the radiology area located on the third floor of the jail. It is unknown if the sudden increase created an overload for the one technician who performs the chest radiographs. The radiology technician was not included in the educational portion of the project which could have had an impact on the project. Another radiology room exists across the street at the other jail facility to perform radiology orders at that facility. The same technician is responsible for orders at both facilities.

Recommendations

The project will continue based on a change in policy. The staff has become familiar with the accepted processes for screening HIV-positive inmates for TB. The senior director has recommended changes in the intake screening note to ensure a PPD and chest x-ray is offered to this patient population to aid the sustainability of the project. HIV-positive inmate were selected due to being immunosuppressed and thereby more susceptible to contracting TB. This process could expand to other immunosuppressed inmates by offering chest x-rays in addition to PPDs to those with chronic diseases. The current cost of reading a chest x-ray is $80 which is high compared to the literature and other facilities who have negotiated a lower cost. The

interpretations of the chest x-rays are done by the radiology department of the main health organization which may provide an opportunity to negotiate a much lower price.

Implications for Practice

It is important for the future of correctional health to stay abreast and abide by standards of care in the community. Screening for TB will always be a mainstay in jails given their close quarters, high risk population, and HIV-positive inmates requiring a PPD and a chest x-ray with every incarceration. There is currently no recommendation on accepting a negative chest x-ray for a specific amount of time (e.g. 6 months, 1 year, 5 years) from an HIV-positive individual for TB clearance in the community or a correctional setting. Policy revisions are necessary to keep up with changing guidelines and disease prevention processes. This facility is often near maximum capacity which necessitated a new addition which is under construction. The increase in inmate capacity could bring further changes to processes, strain officer availability, and therefore hinder intake screening (Gibson & Phillips, 2016). The accrediting body for this facility provides guidance in providing services such as TB screening, and policy development. However, implementation is left up to the facility based on the available of resources, and the ability to handle treatment when there are significant findings. It may be a few years before new guidelines for TB screening in HIV-positive inmates is published. Luckily, this facility is currently up-to-date and capable of handling TB and HIV care beyond screening and testing.

Conclusion

This jail provided an opportunity for the project coordinator to assess its current needs and design a quality improvement project that best fits its ability to utilize resources and offer additional measures to screen HIV-positive inmates for TB. A doctoral-prepared nurse practitioner seeks leadership in challenging environments. Assessing the clinical environment

and becoming interdependent on other professionals is necessary to continually advance practice that reflects the ongoing changes demanded by today's patient population (Lis, Hanson, Burgermeister, & Banfield, 2014). The beginning of any change is the ability to develop relationships with the staff and improve communication within the clinical environment. Understanding process change and its impact beyond the facility into the community is a characteristic of advance nursing practice.

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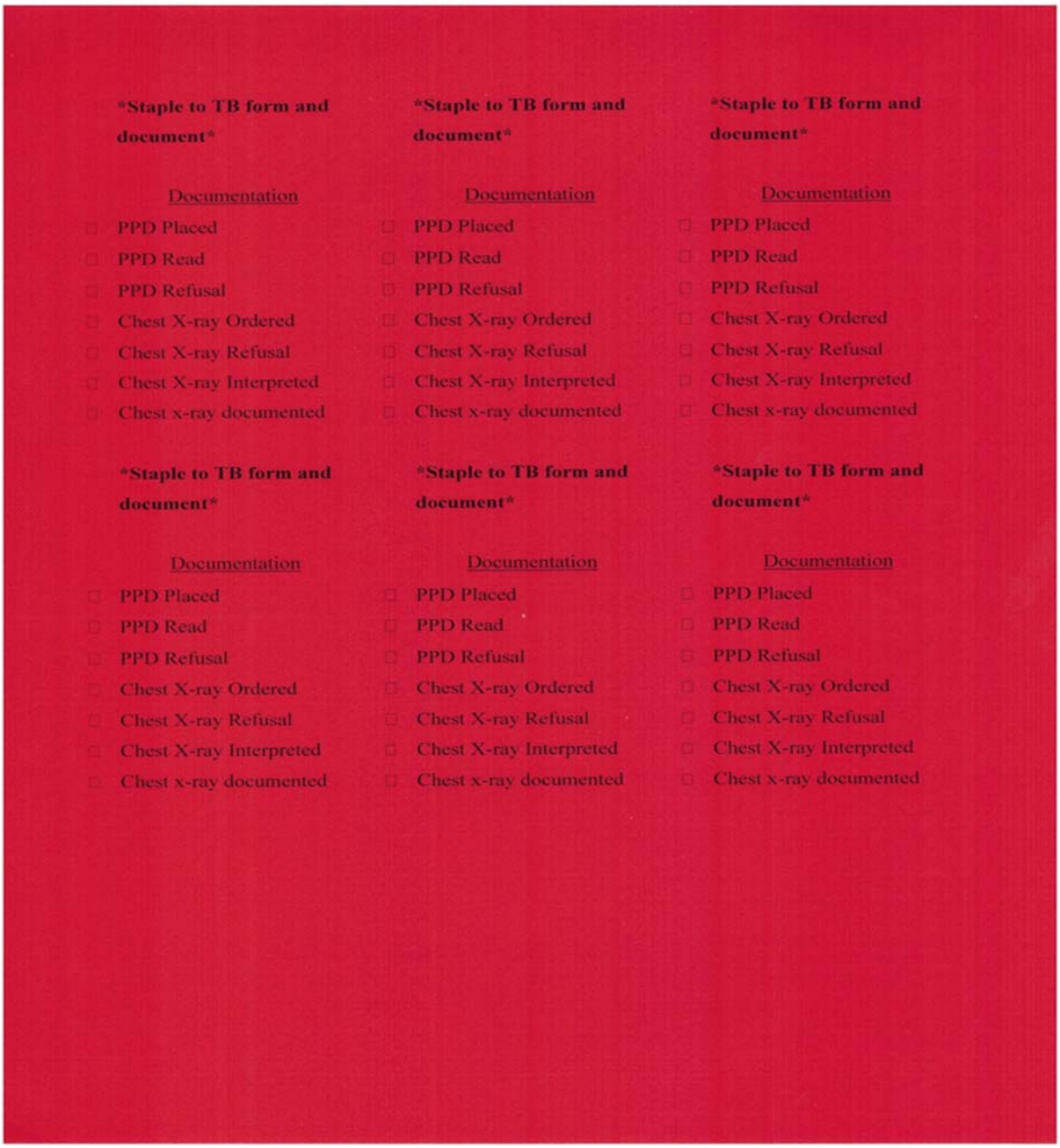
Appendix A


HIV patients:
✓ PPD placed
✓ Chest X-ray Ordered
*regardless of previous visits/results

Appendix B


Staple to TB form and document
Documentation
PPD Placed
PPD Read
PPD Refusal
Chest X-ray Ordered
Chest X-ray Refusal
Chest X-ray Interpreted
Chest x-ray documented
Staple to TB form and document
Documentation
PPD Placed
PPD Read
PPD Refusal
Chest X-ray Ordered
Chest X-ray Refusal
Chest X-ray Interpreted
Chest x-ray documented
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Documentation
PPD Placed
PPD Read
PPD Refusal
Chest X-ray Ordered
Chest X-ray Refusal
Chest X-ray Interpreted
Chest x-ray documented
Staple to TB form and document
Documentation
PPD Placed
PPD Read
PPD Refusal
Chest X-ray Ordered
Chest X-ray Refusal
Chest X-ray Interpreted
Chest x-ray documented
Staple to TB form and document
Documentation
PPD Placed
PPD Read
PPD Refusal
Chest X-ray Ordered
Chest X-ray Refusal
Chest X-ray Interpreted
Chest x-ray documented
Staple to TB form and document
Documentation
PPD Placed
PPD Read
PPD Refusal
Chest X-ray Ordered
Chest X-ray Refusal
Chest X-ray Interpreted
Chest x-ray documented

Appendix C

University Hospital

4502 Medical Drive
San Antonio, Texas 78229

February 28, 2017

Detention Health Care Services
200 N. Comal Street, Suite MT-01
San Antonio, Texas 78207-3573
Phone: (210) 335-6260 Fax: (210) 335-6193

To Whom it may concern,

Detention Health Care Services Senior Director Martha Rodriguez and Medical Director Dr. Jessica Yao grant permission for Domingo Lopez to access the Detention Health Care Services medical records to collect data relative to the DNP Project on Improving Tuberculosis screening and monitoring in patients incarcerated in a jail setting being conducted at the Bexar county jail and annex. Domingo Lopez has permission to access the medical records both pre-intervention and post-intervention. The data elements to be collected have been discussed.

Sincerely,

Signature on file

Martha Rodriguez (Senior Director)
Detention Health Care Services
University Health System

Signature on file

Dr. Jessica Yao, MD (Medical Director)
Detention Health Care Services
University Health System

Appendix D

UNIVERSITY OF THE INCARNATE WORD

May 26 2017

PI: Domingo Lopez

Protocol title: Increasing the adherence to updated clinical practice guidelines for TB screening among HIV patients in a congregate setting utilizing a clinical reminder

Domingo:

Your request to conduct the study titled "Increasing the adherence to updated clinical practice guidelines for TB screening among HIV patients in a congregate setting utilizing a clinical reminder" was approved by Expedited review on 05/26/2017. Your IRB approval number is 17-05-018.

Please keep in mind these additional IRB requirements:

- This approval will expire **one year** from 05/26/2017.
- Request for continuing review must be completed for projects extending past one year. Use the **IRB Continuing Review Request form**.
- Changes in protocol procedures must be approved by the IRB prior to implementation except when necessary to eliminate apparent immediate hazards to the subjects. Use the **IRB Amendment Request form**.
- Any unanticipated problems involving risks to subjects or others must be reported immediately.

Approved protocols are filed by their number. Please refer to this number when communicating about this protocol.

Approval may be suspended or terminated if there is evidence of a) noncompliance with federal regulations or university policy or b) any aberration from the current, approved protocol.

Congratulations and best wishes for successful completion of your research. If you need any assistance, please contact the UIW IRB representative for your college/school or the Office of Research Development.

Sincerely,

Signature on file

Ana Wandless-Hagendorf, PhD, CPRA

Research Officer, Office of Research Development

University of the Incarnate Word

(210) 805-3036

wandless@uiwtx.edu

Appendix E

June 6, 2017

To: Domingo Lopez (Domingo.lopez@uhs-sa.com)
UTHSCSA

From: Institutional Review Board

Subject: **No IRB Approval is Required; Project is Not Regulated Research**

Protocol Number: HSC20170282N
Title: Increasing the adherence to updated clinical practice guidelines for TB screening among HIV patients in a congregate setting utilizing a clinical reminder

Dear Principal Investigator,

It was determined that your project does not require IRB approval because it is:

Not regulated research **as defined by DHHS regulations at 45 CFR 46 and FDA regulations at 21 CFR 56.**
The proposed activity is not funded by DHHS as research; AND is not a systematic investigation to test a hypothesis and permit conclusions to be drawn; AND is not designed to develop or contribute to generalizable knowledge; AND the purpose is not to investigate the safety or effectiveness of a drug, medical device or biologic.

If the goals and/or activities of the project ***change*** during the course of the project, or if new activities are proposed that would constitute human subjects research, please re-contact the OIRB so that we may determine whether or not the revised plan involves human subject research activities.

Project/study sites: University Health System

Sincerely,

Signature on file

Digitally signed by Juanita Ching
DN: cn=Juanita Ching, o=UTHSCSA, ou=OCR, email=ching@uthscsa.edu, c=US
Reason: I am the author of this document
Date: 2017.06.06 13:32:53 -05'00'

Research Compliance Coordinator
Research Protection Programs

Appendix F

University Health System

University Health System
4502 Medical Drive
San Antonio, Texas 78229

UniversityHealthSystem.com

June 16, 2017

Domingo Lopez, RN
Detention Health Care Services (DHCS)-Magistrate Court
University Health System

Dear Mr. Lopez,

Your project titled **"Increasing the adherence to updated clinical practice guidelines for TB screening among HIV patients in a congregate setting utilizing a clinical reminder.", IRB# HSC20170282N** was deemed to be Not Regulated Research. The UHS Research Office has reviewed and approved the project for implementation at University Health System as written in the application documents. No other use of University Health System services or resources is anticipated or authorized.

The protocol has been approved for implementation at the following departments/sites:

- Detention Health Care Services (DHCS) and Medical Records

Should additional services be required, or if we can be of further assistance, please contact the University Health System Research Director at 210-743-6450, or through the Research Office email at research@uhs-sa.com. Thank you for your cooperation. We wish you success with your study and look forward to working with you again.

Sincerely,

Signature on file

Anna Taranova, MD, MS, CCRP
Executive Research Director
Research & Information Management